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ABSTRACT

To address specific workplace literacy needs within the steel fabrication sector in Manitoba, an organizational needs assessment was conducted training manuals were developed using literacy task analysis techniques. The organizational needs assessment assessed the general and workplace literacy tasks and demands of hourly workers at Dominion Bridge and workers' perceptions of the current training practices and need for training in workplace literacy skills. A series of half-hour interviews with 25 workers and focus group discussions with representatives from management, supervisors, and the union were held. According to the respondents, the usual form of training was on the job using a buddy system. The most important types of on-the-job reading were blueprints and drawings. About half the respondents indicated they had some difficulty completing forms and performing some arithmetic operations. Focus groups identified a need for training in reading, writing, and numeracy skills. Recommendations were made for a workplace literacy program at Dominion Ridge and for course content. Clear language manuals were developed for three job operations in the paint department: wheel operator, paint checker, and painter. Literacy task analysis techniques were applied to each job operation in the paint department. (Appendixes include questionnaires, training manuals, literacy task analysis forms, and 14-item bibliography.) (YLB)

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ED 380 693

Organizational Needs Assessment

of

Workplace Literacy Skills

at

Dominion Bridge

Dominion Bridge

A United Dominion Company

STEELWORKERS DISTRICT - 3

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TRAINING MANUAL DEVELOPMENT PROGRAM
DOMINION BRIDGE

Final Report

Organizational Needs Assessment of Workplace Literacy Skills

&

Development of Training Manuals for the Paint Department

by
Janis McKeag
Workplace Literacy Consultant

for
Manitoba Basic Education in the Workplace Steering Committee

February 1993

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INTRODUCTION

This report describes the Training Manual Development Program at Dominion Bridge (Winnipeg, Manitoba). The project was a joint undertaking of Local 4095 of the United Steel Workers of America and Dominion Bridge Management. The funding was provided by the National Literacy Secretariat through the Manitoba Basic Education in the Workplace Steering Committee.

The stimulus for the project was the increasing demands of workplace literacy skills within the steel fabrication industry as noticed by both management and labour. In order to examine the specific workplace literacy needs with in the steel fabrication sector, the project had two components; (a) an Organizational Needs Assessment and (b) the development of training manuals using Literacy Task Analysis techniques.

The Organizational Needs Assessment was designed to determine the training needs of the hourly workers at Dominion Bridge. Examining workplace literacy skills within a job-related context, provided a means of encouraging training based on skills workers already possess. The development of clear language manuals using Literacy Task Analysis Techniques provided a method of differentiating between general workplace literacy skills and literacy skills particular to the Paint Department.

For this project, workplace literacy was defined as the ability to read, write, comprehend, use mathematics and communicate effectively to carry out job operations.

OBJECTIVES

In order to meet these goals , the project team set the following objectives:

1. assess the general workplace literacy tasks and demands of hourly workers, by conducting an Organizational Needs Assessment,
2. identify plant wide workplace literacy training needs,
3. assess perceived needs to facilitate the development of a training program,
4. use three different literacy task analysis approaches to determine and analyze the workplace literacy tasks of the Paint Department,
5. develop literacy tasks analysis forms,
6. develop clear language training manuals for the Paint Department,
7. pilot test the manuals, and
8. evaluate the appropriateness and effectiveness of different literacy task analysis approaches for developing clear language training manuals.

PLAN OF ACTION

The following plan of action was developed to achieve the above objectives:

1. conduct plant wide Information Sessions,
2. conduct an Organizational Needs Assessment of Dominion Bridge,
3. conduct Literacy Task Analysis of three jobs in the Paint Department,
4. develop Literacy Task Analysis forms,
5. write Training Manuals in clear language,
6. pilot test the training manuals, and
7. evaluate the project and make recommendations for further studies.

PROJECT TEAM

Composition

The project team was composed of representatives from union and management. The members of the project team were:

Gord Koch (Operations Manager),
Bill Holowec (Supervisor),
Al Porter (Chief Steward - Union),
Phil Chuhie (Vice-President - Local 4095),
Greg Helm (Paint Department Supervisor),
Janis McKeag (Workplace Literacy Consultant), and
Sue Turner (Manitoba Basic Education in the Workplace Coordinator)

Duties

The project team was responsible for :

a) developing the goals and objective of the project,
b) overseeing the project,
c) addressing any concerns which arose during the course of the project,
d) receiving activity reports,
e) making recommendations, and
f) assessing the process.

Meetings

During the course of the project, the team met, on average, once every two weeks. This allowed for regular reports and feedback on the workings of the project. In general, the meetings ran about 1 hour. Most of the meetings were attended by all of the project team members. However, in all meetings, there was at least one representative from the union and from the management. The consultant attended all meetings. The first meeting was also attended by the local Business Representative of the United Steel Workers Union (Dan Will).

Summary of Project Team Work

The project team

a) established the goals objectives of the project;
b) agreed upon a plan of action and a time frame;
c) received reports and provided feedback;
d) assisted in the development of the Organizational Needs Assessment tool;
e) provided representation at information sessions;
f) addressed concerns such arising during the project, such as liability, safety, access to plant, and ownership rights of training manuals;
g) provided support to consultant in the workplace;
h) participated in the manual revision and pilot testing;
i) promoted the project throughout the plant;
j) provided materials for literacy task analysis;
k) evaluated the literacy task analysis approach for manual development; and
l) recommended the development of a workplace literacy program.

INFORMATION SESSIONS

Format Of Information Sessions

The purpose of the sessions was to inform the workers about the project, answer questions and to introduce the consultant. Information sessions were held for all hourly employees in all departments and shifts at Dominion Bridge. Prior to the session being held , the employees were informed of the information sessions at their daily meetings. The session leaders included a representative form the union, the consultant, and when possible a representative of management.

A total of 12 sessions were held with 178 employees. The sessions were scheduled on company time, and were not conducted over coffee or lunch breaks. The format of the session included an introduction of the project and the consultant, a short presentation by the consultant, a call for volunteers, and a question and answer period. The sessions were designed to last 10-15 minutes. However, some ran longer, depending on the number of questions.

Common Concerns And Questions.

1) "If two employees are doing the same operation in different ways, who is right?". All employees carrying out the same operation would be observed and questioned about the differences, to come a common understanding. If there is more than one way to do the operation, safely, then all will be noted.

2) There was concern about seniority and training manuals, that someone could use the manuals to train, and therefore take the employee's job. The union representative was able to answer this and reduce fears of members.

3) The importance of developing training manuals was illustrated by the union and management representative. They provided examples where they would be useful, based on the real experience of the plant.

5) Concern was expressed about the questionnaire, the responses, and the confidentiality. The project team members were able to respond to this, because they had been involved in the design, and were able to assure potential volunteers that there was nothing to fear.

Recommendations For Future Information Sessions

1) Union representation at all sessions is essential for two main reasons :
   a) to assure employees that the project was not in violation of any union agreement, and
   b) to answer questions about the project in relation to the job descriptions and seniority.

2) A "mini" training session should be held with foremen, supervisors, group leaders and shop stewards to prepare them for the information sessions. This would provide another level of support for the project, as well as ensuring that there would be a group of people to draw on for union and management representation at the sessions, in cases where members from the project team were unable to attend due to work/shift commitments.

3) The project team members need to have better answers as to why this project is being carried out now. Part of the fear on behalf of the workers stems from the past experience where training has been reactive (when something goes wrong), rather than proactive.

4) The information sessions should be held for all employees, hourly, office staff and management, so everyone knows about the project, who is involved and why the consultant is on the plant grounds.

5) Although the volunteers came forward at the information sessions, the opportunity to reflect and make a decision about volunteering should be afforded. This may be accomplished be establishing at time frame during which people who are willing to be interviewed could have a chance to sign up.

ORGANIZATIONAL NEEDS ASSESSMENT

Introduction

The Organizational Needs Assessment was conducted to meet the project goals of assessing the general and workplace literacy tasks and demands of hourly workers, and of assessing the workers' perceptions of the current training practices and the need for training in workplace literacy skills.

In order to accomplish these goals, a series of half hour interviews with 25 hourly workers and focus group discussions with representatives from management, supervisors, and union were held.

Questionnaires

The hourly workers interview instrument was adapted from the Basic Education in the Workplace questionnaire. The final format of the instrument was approved by the project team and the union to ascertain that no question infringed on the workers' rights. See Appendix A for final instrument.

The questionnaire was completed by the interviewer who asked the questions and noted the participants replies on the form. The interviews were not tape recorded as this may have been an infringement on the workers' privacy.

The questionnaire for the focus groups interviews with management, supervisors and union was developed by the consultant. See Appendix B for the questionnaire.

Interviews

Twenty-six hourly workers volunteered to be interviewed, and 25 were interviewed for the Organizational Needs Assessment (ONA). This represented 14.5% of the hourly workforce from all departments and shifts.

The interviews were conducted over a three day period, on company time. The department supervisors made arrangements for work to be covered during the interview time.

The interviews were held in various supervisors' offices around the plant.

The time allocated for each interview was 30 minutes, but some ran longer.

Focus Groups

One session was held with each group: management (2), supervisors (8), and union (2). The interviewer asked the questions and noted the responses. Each session lasted about 45 minutes.

ORGANIZATIONAL NEEDS ASSESSMENT RESULTS

DEMOGRAPHICS AND TRAINING BACKGROUND

General Background

1) All of the participants were male, and their average age was 38.
2) The most common reasons for volunteering to be interviewed were 'curiosity', 'feel have some input', and 'because nobody else did'.

Work Background at Dominion Bridge

1) The average the length of employment with Dominion Bridge was 14 years.
2) The average length of time in current job classification was 10 years.
3) Eighty-eight percent of the participants were in their preferred type of work.

Educational and Training Background

1) The majority (60%) of the participants had completed Grade 11 or 12 in the province of Manitoba, and had followed the general courses at high school.
2) Approximately 50% had taken some form of technical or vocational training after leaving high school. The courses tended to be in trades related areas such as welding, mechanics, electronics, and building construction.
3) Five of the participants had received Journeyperson tickets through in-house apprenticeship programs.
4) About 50 % of the respondents had taken night school courses on their own. The courses could be broken into two main categories: English and Mathematics (upgrading grade levels) and trades related courses.
5) Three respondents had taken University level courses, but none had completed the course of study.
6) About 50 % stated they had taken other forms of training or education. These included other training on the job at other companies, self taught (trades and leisure) and union courses.
7) Two respondents indicated that they had dropped math and university entrance courses due to peer pressure, a fact which they regret today.
8) Five individuals indicated that it was important to include education that one has received in the workplace in the questionnaire as school marks are not always a "true" indication of a person's abilities.

Perception of Training at Dominion Bridge

Hourly Workers

1) All but two respondents indicated they had received some form of training at Dominion Bridge. (Table 1)
2) The usual form of training was on the job using a buddy system. (Table 2)
3) Where the job was specialized or apprenticeable (Fitter Welder, Auto Cad), formal in-house was provided.
4) About 25% would like to have more formal training period when learning a new job, in the areas of basic operation, safety, product awareness, and tricks of the trade.
5) A number of respondents had taken courses offered by the union, primarily in the Health and Safety area (10).
6) About two-thirds of the respondents would like to take courses offered by the union, primarily in the Health and Safety area.
7) During the open ended question about training at Dominion Bridge, the majority of respondents expressed some concerns. They fell into five categories:
   a) there is a lack of training and training programs (6),
   b) training is inconsistent and depends on the person giving it (4),
   c) training could be taken more seriously and be more comprehensive (9),
   d) training is done on an ad-hoc basis as needed (2), and
   e) there used to be more training when there were "helper" job classifications (2).

Focus Groups

1) There is no formal training path at Dominion Bridge.
2) The training is done primarily by the department supervisors and job operators. It is guided by need and the collective agreement.
3) Specialized training is provided, e.g.. Fitter-Welder and NC machines.
4) Safety training has been primarily reactive, except WHIMS which was mandated by law.
5) Training has been perceived as being the prerogative of office staff and management, except for specific trades.
6) Training costs. Resources are stretched to the limit.
7) The primary need for training at Dominion Bridge is in the area of job operations (cross training).
8) There is a need to work on developing positive attitudes towards training.

Table 1 Type of Training Received at Dominion Bridge

Type of Training	Number of Persons
On the Job Training*	14
Fitter Welder Training	4
Blueprint Reading Course	3
Computer (Auto Cad)	2
Galvanizing Training	1
Spot Welding	1
Fork Lift Truck Safety Course	1
Management Courses	1
Magnetic Particle Inspection	1
X-Ray Welding Work	1
Steel Fabricating Course	1

* On the job training includes:
- 1-2 weeks under partial supervision
- trial and error
- working with someone
- watch and learn
- learning by experience

Table 2 Training Would Like to Have Received at Dominion Bridge

Type of Training	Number of Persons
Fitter Welder	1
Basic Orientation	3
Product Orientation	2
Welder	2
Safety	2
Steel Fabricator	1
Blueprint Reading	1
Computer Related	1

GENERAL LITERACY SKILLS

Reading

1) Sixty percent of the respondents stated they read the newspaper everyday.
2) The majority (68%) stated that they did not read magazines from cover to cover. They tended to skim articles and then read in-depth those pieces which had relevance to their lives.
3) Only two respondents stated they read books more that twice a year.
4) If school or community notices were applicable, they were read in depth by a third of the respondents.
5) Seventy-two percent of the respondents used a dictionary if needed. The frequency of use increased when the person was taking a course.

Writing

1) In general, the respondents did not perform much writing outside of the work setting. Their preferred mode of communication was the telephone.
2) The majority of respondents did neither informal (68%) nor formal (50%) letter writing. Most of the formal letter writing was job related: letters of application or absence.
3) Often when formal types of writing had to be done in the home setting, it was the spouse who did it.
4) More writing had been done when a respondent was in school or studying.

Numeracy

1) When asked if they took the time to verify bills (e.g. VISA statements, invoices) for additions, taxes charges etc., all but one respondent replied in the affirmative, but the degree to which they did this varied.
2) About half (52%) of the respondents reconciled their bank statements regularly.
3) Five individuals did their own income tax forms each year.
4) Over half (60%) indicated that loan and mortgage applications posed some problems. For a third of these, the major problem was the jargon.

Oral Communication Skills

1) English was the first language for 76% of the respondents.
   Other first languages included : German (3), Filipino (2) and Tagalog (1).
2) For those whose first language was German, English was learned at home and in school in Manitoba.
   For those whose first language was Filipino or Tagalog, English was acquired through studying English as a second language in their homeland.
3) Only one person indicated that they experienced any difficulty communicating on the telephone, visits to doctor's offices or child's school.

WORKPLACE LITERACY SKILLS

Reading

1) While signs, such as safety, were read when they were "new" or "fresh", they tended to fade into the background after a while.
2) The reading of instructions depended on the situation and experience of the operator. About half of the respondents would perform a combination of using the instructions while trying the machine. A quarter preferred the trial and error method, using instructions as a last resort, and the rest read all the instructions before starting.
3) When questioned about inserts which might be found in pay envelopes, 48% skimmed the material to decided if it was relevant and worth their time to read.
4) Reference, trade or technical manuals were found essential by three respondents; used if relevant by seven; and used only as a last resort by the rest.
5) Handwritten notes were read if directed to them specifically or posted on their station or machine. They were most commonly found if person was working on night shift. Again they were skimmed for details.
6) Bulletin Board notices appeared to be the major form of communication at Dominion Bridge. They were checked at least once a week by everyone.
7) Union material was skimmed for relevancy and then read in-depth if found to be relevant. Reasons for relevancy included : stories about Dominion Bridge, Canadian content or upcoming projects.
8) Job Orders were "just part of the job" and therefore not perceived as being "real reading". Only one third (36%) of the respondents stated they read job orders.

9) It would appear the most important types of on-the-job reading are blueprints and drawings. The amount of time spent on these could vary from skimming and scanning to intensive study of up to an hour.
10) The types of reading performed on the job are shown in Table 3.

Writing

1) Form completion presented some problems for about half of the respondents. The greatest problem was the format of the form and not the language.
2) Fifty percent stated they did write some type of safety report. The others stated that they gave their reports verbally to the supervisor who wrote it down.
3) Only one person said they did union related writing, which was the taking of minutes at the meeting.
4) Only one quarter of the respondents stated that they wrote job instructions such as leaving notes for the next shift.
5) Although time card completion is required by every worker, only half the respondents reported doing this type of writing.
6) The amount of writing depended on the job, department, and shift.
7) More writing occurred if there is another shift in the department.
8) More writing happened in the past. Presently, the information is given verbally to the supervisor who writes it down.
9) The types of writing performed on the job are shown in Table 4.

Table 3 Types of On the Job Reading Documents

Type	Number of Responses
B Sheets	4
Bills (Shipping, Lading)	4
Blueprints	4
Cards (Time, Job)	2
Charts (Load)	2
Check Lengths	1
Contract Numbers	2
Control Numbers	1
Drawings	5
Hand Sketches	1
Newspapers	3
Piece Numbers	2
Programs	1
Schedules	2
Sheets (Job, Information, Piece)	3
Tags	1

Table 4 Types of On the Job Writing

Type	Number of Responses
Corrections	1
Day/Time Cards	13
Instructions	1
Graffiti	1
Holiday Requests	1
Job Cards	1
Load Charts	1
Manufacturing Verification Sheets	1
Marking	3
Non-compliance Reports	2
Notes for Next Shift	8
Numbers	1
Piece Sheets	1
Purchase Orders	1
Shipping Contracts	1
Shipping Tags	1
Signs	1
Tags	2
Transfers to Next Department	1
Warnings	1
Work Schedules	1

Numeracy

1) About half the respondents indicated that they had some difficulty performing some arithmetic operations. Addition, subtraction, division, and multiplication were not a problem, while working with decimals, percentages fractions were.
2) All but one person indicated they performed job calculations, although the frequency varied.
3) All respondents stated they verified the deductions on their pay stubs.
4) Metric measurement was a area of great concern.
   The general consensus, was whether or not an individual liked working with metric, one had to do it on the floor.
5) Only a quarter of the respondents stated that they had no problem working with the metric system, and this was because they had learned it in school.
   Yet, they still had to use the Imperial system at the plant.
6) Five individuals used a tape measure with both systems on it to deal with the metric/imperial conversion problem. Another respondent took it to the office .
7) The types of numerical operations are highlighted in Table 5.

Table 5 Types of On the Job Numerical Operations

Type	Number of Responses
AB Drill	1
Addition (length, width, loads)	10
Calculate Dimensions	2
Calipers	1
Counting (Pieces)	9
Flow Sheets	1
Footage	1
Marking	1
Measuring	1
Multiplication	3
Numbers (working with)	2
Quantity	2
Read to Cut	1
Subtraction	1
Tickets	1
Tolerance	1
Totals	1
Estimates	1

Workplace Oral Communication Skills

1) English is the language of communication at Dominion Bridge.
2) Difficulties in being understood or in understanding can be broken into three main reasons: the level of noise on the floor and the necessity of using ear protection, differing language or terminology, and different accents.
3) The general consensus was that there were not great problems of communication, especially if people took the time to do it face to face.
4) At daily or union meetings, most respondents stated that they felt comfortable speaking up or asking questions. Others said they waited until they could do it on a one to one basis.

Computer Experience

1) About half the respondents had no experience with computers
2) Only 3 used a computer on a regular basis either at home or on the job.
3) The majority indicated that computer training should be offered by the company.

FOCUS GROUPS

Workplace Literacy Needs

1) There is a need for training in reading, writing and numeracy skills.
   The primary points of concern are :
   a) reading of manuals,
   b) metric and imperial systems of measurement,
   c) fractions, and
   d) percentages.
2) There is some concern about training older workers:
   a) will they want it,
   b) is it worthwhile.
3) It is difficult to use state of the art manufacturing if the workforce does not possess the basic skills.
4) Workers must start to take responsibility for on-going education (attitude).

RECOMMENDATIONS

WORKPLACE LITERACY ONA INSTRUMENT

- If asking about bank statements, need to include the term of reference of credit unions to cover all types of banking institutions.

- When gathering information about educational background, add the open ended questions: a)' What was your favourite subject?'
  b) ' What was your least favourite subject? ' and
  c) ' Why?' .

- Drop the rating scale for enjoyment.

- It may be useful to have the participants estimate how much they carry out various workplace literacy tasks.

- When asking about reading, provide examples of reading documents, such as comic books, Bible, types of magazines.

- During the interview, a blank copy of the instrument could be given to the volunteer to follow along as the questions were being asked.

- Examples of workplace material should be available to illustrate different components.

- If the focus of the ONA is to be on work-related literacy skills from a job context, then perhaps the focus should remain solely on workplace literacy skills and education and training and leave out the general literacy components.

WORKPLACE LITERACY PROGRAM AT DOMINION BRIDGE

Workplace Course Development

The recommendations are listed below followed by adult learning principles in parentheses.

- Prior to final development, a workplace needs assessment survey, based on the above recommendations, could be distributed to all hourly employees. This would permit all hourly workers to have input. (Feeling of Participation)

- Ask interested employees to assist in the development of in-house course modules for their specific areas. (Empowerment of workers)

- Safety should be an integral part of the course development.

- Many people would like to know more about the products they are producing and how they fit into the overall scheme of the plant and its operation. (Relevancy)

COURSE CONTENT

Reading Skills

- Use materials directly related to the work carried out at Dominion Bridge.

- Use magazines from the union, steelworkers, and in-plant publications.

- Skimming and scanning skill development should be part of a part of the course.

- The analyses of technical manuals and the teaching of specific reading skills for this type of reading should be included.

- The course should also include a section on how to complete forms commonly used at the plant. (This encompasses reading and writing skills.)

❖ A "dictionary" of commonly used jargon and buzz words should be developed.

❖ Using WHMIS materials, a safety reading component could be included.

Writing Skills

❖ One of the major concerns in the writing area was the difficulty of reading different writing. The development of legible writing skills should be in the course.

❖ Writing for in-house newsletter, or the development of same should be part of the course, as this would encourage participants to write about items that are relevant to their work lives.

❖ Safety report writing should also be a component of the course.

Numeracy Skills

It is recommended that the following sections be included.

❖ Metric and Imperial Measurement
❖ Decimals, Fractions and Percentages
❖ Practical experience with machines and instruments using numbers

Computer Skills

❖ The reading of sections' data entry need to be taught.
❖ Practical skills on computer use need to be developed.

Oral Communication Skills

Course content should include the following skills.

❖ Practical Listening
❖ Questioning Techniques
❖ Critical Thinking
❖ Public Speaking

TRAINING MANUAL DEVELOPMENT

USING

LITERACY TASK ANALYSIS TECHNIQUES

TRAINING MANUAL DEVELOPMENT

The intent of this component of the project was to develop clear language manuals for three job operations in the Paint Department; Wheel Operator, Paint Checker, and Painter. Literacy Task Analysis (LTA) techniques were applied to each of the job operations in the Paint Department.

OBJECTIVES FOR THE TRAINING MANUAL DEVELOPMENT COMPONENT

1) To adapt and formulate a Literacy Task Analysis technique for a trades area.
2) To use the LTA to develop the manuals.
3) To use the LTA to highlight the importance of workplace literacy skills in the three job operations.
4) To use a different modification of the LTA approach for each of the three operations.
5) To evaluate which LTA modification would be most efficient for further development.
7) To develop manuals for three job operations in the Paint Department.
8) To write the manuals in clear language.

PAINT DEPARTMENT BACKGROUND

The job operations in the Paint Department have been in existence for varying periods of time and as a consequence, there were various amounts of material available for assessment. Job descriptions existed for each operation, providing the general overview of the job duties of the jobs.

Painter

An in-depth operating manual for the Painter operation was made up in 1972. While some of the basic information was still applicable, much of it was outdated due to new equipment, product material, and increased safety standards and practices. A daily operations sheet was designed in 1989, but it did not provide enough detail for training. The approved job description dated from 1975. Other documentation from product suppliers, provided specifics as to the 'how-to' and 'why' of application but not the actual operation of the job.

Paint Checker

There was no manual or other written information beyond the job description (1982) for the Paint Checker Operation. This job operation was created 11 years ago, when the present paint department was set up. The incumbent has been the primary worker in this position during this period.

Wheel Operator

The Wheel Operator job description dated from 1982-83. The existing manual was from the manufacturer and gave detailed information as how to operate and maintain the WheelAbrator machine. The operating manual combined two jobs; the operator and the mechanic. There was no step-by-step operational guide for the wheel operator position.

LITERACY TASK ANALYSIS TECHNIQUES

General Background

Literacy Task Analysis is both a method and a tool used to identify the workplace literacy skills needed to carry out job related job tasks (Taylor & Lewe, 1990; Carnevale, Gainer & Meltzer, 1990; Meenan, 1989). It is based on job and task analysis techniques which have been developed and designed to reveal the knowledge, skills, and abilities required for competent job performance (Carnevale, Gainer & Meltzer, 1990). Within an Instructional Systems Design (ISD) approach, the purpose of literacy task analysis is to reveal the reading, mathematics and communication used in the actual job operation. (Gagné, Briggs, & Wagner, 1988; Dick and Carey, 1990) Once these are identified, they form the basis for developing occupational specific materials for training programs.

According to Taylor & Lewe (1990), Carnevale (1990), and Meenan (1989), the general process for conducting a LTA, includes:

a) familiarization with the work place;
b) identification of the main duties, tasks, or activities of the job, through interviews, and job descriptions;
c) collection of information about how the job is performed, including past knowledge, specific skills, equipment and tools used, decision making points, through observation of workers in the job;
d) development of a task inventory listing the main job duties, tasks for each duty and steps for each task;
e) verification of the information collected;
f) analysis of the steps for reading, writing, computation and communication tasks needed to carry out various steps of the job ; and
g) assembly of the LTA information into a usable form for curriculum development.

Dominion Bridge

At Dominion Bridge, the general process for Literacy Task Analysis was followed. The following steps were common to all three job operations: on-site observation, job descriptions, collection of workplace documents and analysis of materials. Prior to final approval and publication, the manual for each operation was tested with a person possessing the necessary pre-requisite knowledge and skills, but who had never performed that particular operation. The finalized manuals may be found in Appendix C.

Wheel Operator

The consultant met with the Greg Helm, supervisor of the Paint Department, and obtained the manufacturer's manual for the WheelAbrator Machine. With this document and the job description, a rough outline of the duties and tasks of the job operation was drawn up prior to meeting with a job incumbent. Points of clarification were also identified.

The consultant then spent three half days over the course of 2 weeks with two incumbents, (one day shift, one night shift) observing various stages of the job operation. During this time, various work documents were collected.

From this work, an initial draft of the manual was developed. It was given to the supervisor and the incumbents to review and amend as necessary. After revisions were made, a person who had not done the job before used the manual to walk through the job operations. The consultant observed the test, and asked questions about the ease of use of the manual. The suggestions were incorporated into the design of layout of the manual and used as a format for the other operations.

Paint Checker

As there was nothing beyond the job description for the Paint checker operation, the consultant developed the initial draft of the manual from on the job observation of the incumbent. A total of five days were spent to obtain the information in a usable form. The method involved observing the various job duties of the operation in the during various times of the shift, followed by the development of the task steps.

These were then reviewed by the incumbent, and amendments were made. The next step was to order the duties and tasks into a logical sequence.

The initial manual was then reviewed by two employees who perform this operation on a replacement basis. Revision were made and the manual was evaluated by having an employee who had the required pre-requisite training in blueprint reading and crane operation and who had never performed the job operation use the manual to carry out the job operation.

Painter

The initial training manual was developed from a group interview with painters. Using the job description as the basis for discussion, the consultant set up a meeting with three employees who worked in this job operation. With their permission, the session was taped. During the session, the employees were asked to describe the job tasks for a "typical" shift. This permitted the participants to springboard off each others' comments. When points or ideas were not clear, clarification and explanation was sought. Where there were divergent comments or courses of action, discussion was directed until there was consensus.

After the tape was transcribed, a draft of the manual was developed in conjunction with the daily operation sheet. The consultant then went to observe the job operation with two of the participants. Any discrepancies between the draft manual and the observation were clarified and revisions to the manual were made. This revised manual was then circulated to the participants for comments and feedback.

The 1972 manual was brought to the attention of the consultant, only after the above steps were taken. The consultant reviewed the manual and compared in to the one which had been developed. All salient points had been covered through the process.

Literacy Task Analysis of Paint Department Operations

Based on work by Carnes (1991), Camevale, Gainer, & Meltzer (1990), Conrath (1991), Manly (1991), McKeag (1991), Philippi (1989), and Taylor & Lewe (1990), literacy task analysis (LTA) forms were developed. These were designed to display the workplace literacy skills needed for specific job tasks for the three job operations of the Paint Department at Dominion Bridge. Sample forms may be found in Appendix D. Complete LTA forms for each of the three operations may be found in Appendix E. A summary of the results are presented in Table 6.

EVALUATION OF THE DIFFERENT APPROACHES

Due to the different material which was available for each job operation, it was difficult to accurately assess the differences between the approaches, as each approach reflected the reality of the situation for each job operation. It would appear that the least effective way was to develop the manual from purely on-the-job observation. The most efficient way was to use the group session for the initial development.

For future work, it is recommended that group session be held with job incumbents to get a sense of the job duties involved prior to on site observation. However, a familiarization tour, and visitation with employees in the department should be conducted prior to the group session.

It is essential that after the manual is first drafted, that it be reviewed by the job incumbents and the department supervisor. The revised manual must then be tested prior to final approval.

The recommended format, is to have a summary of duties page to begin the manual, with reference pages for actual detailed operation beside the steps.

It is also recognized that the training manuals are not a stand alone packages. They are to serve as a complementary training aid in conjunction with in-person orientation and on-the-job training.

Table 6 Summary Results Of The Literacy Task Analysis.

General - Dominion Bridge	Workplace Literacy Skills
1. Safety Rules and Regulations	Reading, Symbols, Technical Jargon
2. Time Cards	Date/Time, Numbers, Form Completion
3. Participation in Daily Meetings	Listening and Speaking skills
4. Material Product Safety Sheets	Reading, Symbols, Technical Jargon

General - Paint Department	Workplace Literacy Skills
1. SN1 sketches	Reading, Symbols, Technical Jargon
2. Tags	Matching Number and Letters
3. Notes left by other shifts	Reading
4. Leave Notes	Writing
5. Rack Loading	Hand Signals

Paint Checker	Workplace Literacy Skills
1. Blueprints, Drawings	Interpretation, Numbers, Locate Information, Symbols, Numbers, Reading
2. Humidity Readings	Reading & Writing Numbers
3. Paint Thickness	Reading, Writing, Comparison, Subtraction
4. Project Shop Issue	Skim & Scan, Number Recognition
5. Log sheets	Counting, Writing

Painter	Workplace Literacy Skills
1. Paint Labels	Read for Information, Technical Jargon
2. Government Information Sheets	Technical Jargon, Skim & Scan
3. Dial/ Pressure Settings	Numbers, Multiplication
4. Nozzle Tip sizes	Numbers, Multiplication

Wheel Operator	Workplace Literacy Skills
1. Ammeter readings	Number Recognition, Comparison
2. Manometer reading	Number Recognition, Comparison

PROJECT EVALUATION

OBJECTIVES

Organizational Needs Assessment

Recommendations for changes include: Information Sessions to be held for all plant employees, even those not directly involved with the program, and a refinement of the questionnaire to better reflect the organization.

Plant Wide Workplace Literacy Needs

Reading, writing, mathematics, and communication are essential skills for job operations at Dominion Bridge. While specific skills vary from department to departments, all areas require basic reading and math skills.

Development of Workplace Language Programs

It was recommended that workplace language programs be implemented. Three separate programs, each with different focus have begun.

Literacy Task Analysis

* Three variations of literacy task analysis approach were used. The variations were: (a) examination of existing material followed by operator observation, (b) strictly job incumbent observation, and (c) a group discussion, followed by operator observation and examination of material.

* It was perceived that the approach where job incumbents were brought together for a focus group discussion prior to specific operation was the best approach for Dominion Bridge.

* Literacy task analysis form were developed and may be found in Appendix D.

Training Manual Development

Manuals were developed for each of the three job operations in the Paint Department. Each manual was reviewed by the department supervisor and job incumbents prior to testing. Each was tested twice with individuals who had never performed the job operation.

OUTCOMES

- Three workplace language programs have been started at Dominion Bridge.
- Three training manuals have been developed.
- Literacy Task Analysis forms have been developed.
- Increased appreciation of the workplace literacy skills needed for job operations.
- Recognition by workers that they do read on the job.
- Beginning of development of learning culture at Dominion Bridge.

RECOMMENDATIONS FOR FURTHER WORK

- The Literacy Task Analysis form be tested in another department at Dominion Bridge. This would permit an assessment of the application and transferability of the LTA form.

- The department to assess transferability should include areas where the jobs are in non-apprenticeable trades, and where machine operation is a major component.

- Assessment of the LTA form to evaluate its usefulness as a tool to identify training needs without the development of training manuals.

Appendix A

TRAINING MANUAL DEVELOPMENT PROGRAM
DOMINION BRIDGE - ONA

BACKGROUND

Name: _____

Age: _____

Gender: _____

Reason for interest in TMDP at Dominion Bridge : _____

_____

WORK DETAILS

Job Title _____

How long have you been with DB? _____

How long have you been in this job? _____

Previous Jobs with DB: _____

_____

Preferred Work: _____

What work related training have you received at DB? _____

_____

Is there any training you would like to do related to work? _____

_____

EDUCATIONAL BACKGROUND

Highest Grade Level Completed? _____ Where? _____

What courses did you take ? _____

Vocational Training

Community College Programs _____

Night School Courses _____

University _____

Apprenticeship _____ Which Trade? _____

With Whom _____ ? What Level? _____

Have you taken any other training? ____ Explain: _____

Union training courses? _____ Which Ones? _____

Are there any union courses you would like to take? _____

Other interest, hobby or skill courses? _____

READING

On a scale of 1 to 5, with 1 being lowest, how much do you enjoy reading? _____

On a scale of 1 to 5, with 1 being lowest, how much reading do you do

on the job _____; at home _____.

For the following types of reading material, tell me how often you read each one, and if you would like to do this better.

Newspapers _____

Magazines _____

Signs (safety, street, work) _____

Instructions (safety, operating, games, appliances) _____

Bulletin Boards (job postings, notices) _____

Written information about and on pay slips _____

School Reports, Notices _____

Union Material (newsletter, contracts) _____

Dictionary _____

Reference Materials _____

Trade/Technical Manuals _____

Job Orders _____

Written Instructions _____

Other _____

WRITING

On a scale of 1 to 5, with 1 being lowest, how much do you enjoy writing? _____

On a scale of 1 to 5, with 1 being lowest, how much writing do you do

on the job _____; at home _____.

For the following types of writing, tell me how often you do each one, and if you would like to do it better.

Complete forms _____

Letters to friends/relatives _____

Job Instructions _____

Safety Reports _____

Notes to child's school _____

Letters to editor, stories, poems _____

Other _____

APPENDICES

NUMERACY

On a scale of 1 to 5, with 1 being lowest, how much do you enjoy working with numbers ? _____

On a scale of 1 to 5, with 1 being lowest, how much working with numbers do you do on the job _____; at home _____.

For the following types of numerical operations, tell me how often you do each one, and if you would like to do it better.

Calculations for job operations _____

Doing Arithmetic

addition, subtraction, multiplication, division _____

fractions, percentages _____

Use a calculator _____

Understanding pay slips _____

Checking Bills _____

Dealing with bank loans/mortgages _____

Reconciling bank statements _____

Tax Forms _____

Metric Measurement _____

Other _____

COMPUTERS

Do you have any experience with computers, at home or on the job? _____

ORAL COMMUNICATION SKILLS

What is your first language?_____

Do you speak any other languages ? _____ _____

Language used at work? _____; With Supervisors _____; With Co-workers _____

If English is not your first language, have you studied English before? _____

Where _____; When _____; For how long? _____

Have you ever experienced any difficulty understanding sometime?

Example: _____

Have you ever experienced any difficulty in making yourself understood?

Example: _____

For the following types of communications, tell me how often you do each one, and if you would like to do it better.

Telephone _____
Doctor/Dentist Visit _____
Teachers _____
Work Duties _____
Co-workers _____
Shop Steward _____
Union Meetings (e.g. speaking up) _____
Company Meetings (e.g. asking questions _____
Other : _____

OTHER COMMENTS

Do you have any additional comments or questions?

_____
_____
_____
_____
_____

Appendix B

FOCUS GROUP QUESTIONS
MANAGERS, SUPERVISORS, AND UNION

1. Who is responsible for training (overall) at Dominion Bridge?

2. Is there any kind of standard training provided for all employees, for example, when they start, or return after lay off?

3. What kind of training is provided for employees for job operations?

4. Is there any general training, such as for safety ?

5. Is there a company policy on training and education ? Such as who can attend or apply for training ? or When they can attend ? or Reimbursement ?

6. How do you advertise/promote training which is available

7. What are your perceptions of the need for training at Dominion Bridge ?

8. What do you think is needed in the way of workplace literacy training ? That is reading, writing, math and communication skills needed at Dominion Bridge

9. Do you have any other ideas, points, or concerns regarding training at Dominion Bridge?

PAINT DEPARTMENT TRAINING MANUAL

GLOSSARY OF TERMS

ATOMIZATION	Dispersal of paint droplets.
BLAST CLEANING	Operation of preparing steel surface with WheelAbrator

White Metal Blasting (SSPC-SP5)
The removal of all visible rust, mill scale, paint and contaminants, leaving the metal uniformly white or gray in appearance.

Near White Blast (SSPC-SP10)
The removal of all rust, rust scale paint and foreign matter. 95% of the surface shall be free of residue. Very high shadows or streaks or slight discoloration covered by rust stain, mill scale oxides or light residue may remain.

Commercial Blast (SSPC-SP6) Two-thirds of the surface is free from contaminants, rust and mill scale.

BLOW VANES	The vanes inside of shot thrower (wheels)
CABINET LINERS	The rectangular plates on the walls to shot wheels.
COATING	Description of applying product to protect against environments.
CURING TIME	The length of time it takes for the liquid paint to reach a solid state of hardness.
DUST COLLECTOR	Inside system of ducts and valves set up to collect dust from around the wheel.
DUST HOPPER	Outside bag and shaker mechanism to collect dust.
FINGERING	Lines coming up in paint.
HOLIDAYING	A spot accidentally left uncovered on coated surface.
LAMINATION	Steel coming apart in layers (splits).
MASKING	Operation of covering parts of work piece with masking tape and/or paper to block primer or paint from area.
ORIFICE	The mouth or opening of a hole

PAINT	Combination of pigment and binders.
POT LIFE OF PAINT	Length of time the paint is usable once mixed.
PRIMER	Coating material applied as first coat.
PSI	Pounds per square inch. Pressure reading.
RACK	Name used for trees or carts used at plant to move material from one place to another.
SCALE	The flake left on the steel after rolling.
SPLATTER	Small spots of weld metal that are not on weld seam.
TOWVEYOR	Chain and pulley mechanism (conveyor)which pulls the racks through the wheelabrator.
TREES	Another name for racks.
VANES	These are found in the wheels inside the cabinet.
VISCOSITY	Thickness of paint
WHMIS	Waste Hazardous Materials Information System
WHEEL	Common name for the wheelabrator machine.

PAINT CHECKER

SUMMARY OF JOB DUTIES	PAGE	STEP
START OF SHIFT		
1. Receive instructions.	1	A
2. Check to see what material is in the department and what stage of the process it is at.	2	B-2
3. Plan out order of work in department.		
4. Check material to drawings.	2	B-4
5. Check tag number of material in the department	2	B-1
6. Check crane cables - limit switches and record in log book	2	D
7. Communicate with others, to set up flow of operation for the department.		
8. Check with painters for safety apparel. Supply when needed. (See mechanic)		
DURING SHIFT		
1. Perform work on what needs to be done:		
a) moving material;	2	D
b) marking material;	4	F
c) masking material;	2	C
d) perform test and record results for		
paint thickness;	3	E 1,2,3
humidity;	4	E-4
e) paper work;	5	G
- record on log sheet what went out the door.		
- file recent drawings.		
2. Check SN 1 sheets for new contracts.	1	A-1,3
3. Check drawings for information on masking, etc.	2	C-1
4. Check with Inspectors when there is non-conformance to drawings.	2	B-6
END OF SHIFT		
1. Cancel out drawings.	5	G
2. Enter information into computer.	6	I
3. Set up night shift (if there is one).		
4. When on one shift, or at end of last shift, secure building. Turn off lights and lock doors.		

A. RECEIVES DRAWINGS, INSTRUCTIONS AND SHIPPING BILLS

1. Attend daily meetings to receive instructions.
   Instructions can be:
   a) verbal from supervisor,
   b) handwritten notes, or
   c) read directly from SN1 sketches.

   Instructions may include:
   a) contract number
   b) piece number
   c) number of pieces
   d) the order of the work to be done (rush or priority),
   e) what must be accomplished on the shift.

   Information on SN1 sketches includes:
   a) type of primer,
   b) type of paint,
   c) number of mils thickness,
   d) areas not to be coated,
   e) what is bolted,
   f)what is top coated,
   g) what is bolted before primer and after primer,
   h) ship bolted.

2. Go to drawing office to get drawings and blueprints

3. A list of drawings (**Project Shop Issue**)which are to come down are given to the paint checker, supervisor, or are put in small office.

4. Shipping bills - verbal orders, e.g. "this piece is rush", given by supervisor.

5. May get messages about special concerns, type of paint, equipment problems, product, or changes.

6. Go to Drafting/Drawing Office to get drawings.
   Bring them to the Paint Department. Fold and stamp them.
   File in cabinet in office under the contract number.

7. Go to Planning Department to get custom jobs, N contracts, and revisions.

1

B. CHECKS MATERIAL TO DRAWING TO ENSURE THAT THE MATERIAL, DRAWING AND TAG CORRESPOND WITH EACH OTHER

Start this operation as material comes through the wheel, or in morning.
1. Check tag numbers to see they correspond to contract number on drawing. Record tag numbers on and enter on log sheet.
2. Pull out drawings and place on clip board marked with contract number.
3. Read drawings, blueprints, and SN 1 to determine the work to be done.
4. Check material for defects and blast.
5. Report any possible errors in finished material to supervisor.
6. Check with supervisor or inspectors on doubtful or erroneous information on drawings.

C. MASK AREAS OF MATERIAL THAT DO NOT REQUIRE PAINTING

1. Identify Areas to be Masked

1. Locate areas to be masked on drawings or SN1 sketches.
   Masking is usually indicated by :
   a) N/P in a triangle;
   b) N/P without the triangle;
   c) written on drawing as a note (e.g. No Paint within 75 mils of all holes);
   d) verbally from supervisor.
2. Determine when masking is to be done:
   before primer put on, after primer, or before top coat.

2. Mask Areas

1. Use masking tape which is about 1 1/2 inches (37 mils) wide.
2. One layer of masking tape is sufficient coverage.
3. On large surface, such as plates, use a combination of masking paper and tape.
4. Masking Holes
   a) Determine the space around holes (usually 75 mils) to be masked.
   b) Mask half a hole with one pass of the tape, the other half with second pass.
   c) There should be one center strip and one strip each side of hole.
5. Masking to Edges
   Mask right to edge, but not over the edge.
6. Masking Fillet Welds
   Do not mask to the edge of fillet welds leave at least 1/4 inch space from fillet weld.
7. Masking larger spaces
   a) Place the first strip across the pieces, with a bit hanging over the edge,
   b) Mask down the piece, with all parts of the masking tape overlapping.
   c) This way, when pulling the masking off, it should come off in one pull.
8. Inside Flanges - no taping required.

D. MATERIAL HANDLING

1. Operate radio controlled crane
2. Move carts around to ensure smooth flow of operation.

2

E. CHECK MATERIALS FOR CONFORMITY OF PAINT APPLICATION

1. Paint Thickness Mil Reading Operation

1. Take readings for paint thickness and primer thickness.
   a) take paint mil reading every shift.
   b) take paint thickness readings at beginning of contract, to ensure material is covered according to specifications.
2. For same contract and similar piece, check the driest pieces.
   If busy, put a car aside for testing.
   Test one piece off the car.
3. Check specifications for thickness required by contract.
4. Enter readings in log books.
   a) The readings are averaged.
   b) The acceptable tolerance is 1 mil either way from thickness required.
5. Paint thickness reading may be taken wet or dry.
   The preferred method is dry paint testing, as paint shrinks as it dries.

2. Dry Paint Thickness Readings (Using PosiTector 5000)

1. Check dryness of the paint.
   a) If it is not dry enough, and the operator will have to use film to take readings. The film is 5 mils thick, so subtract 5 mils from readings if use film.
   b) If the paint is not dry enough, the probe on the PosiTector will dig into the paint and give a false reading.

2. Calibrate (zero) the PosiTector 5000.
   a) Slide back cover to release probe.
   b) Press probe against test piece of metal it should read zero.
   c) To set to zero press the plus and then the negative button. The machine should beep and read zero on the screen.
   d) Press probe against test metal again, it should now read zero.

3. Take random readings from top, bottom, sides, ends, and middle.
   a) Press PosiTector against metal, using film if necessary.
   b) Read the numbers on the screen.

4. Record readings on correct forms.
   Remember to subtract 5 mils if using film.
   The data may be put in whole or decimal numbers. Be consistent.

3. Wet Paint Thickness Readings (Using Wet Paint Gauge)
See Painter Module Operation F Step 7.

1. Use a wet film gauge.
2. Place the gauge on the piece.
3. Take number by the largest notch which the paint fills.
4. Enter reading on form.

3

4. Humidity Reading (Using a Sling Psychometer)

1. Take a reading three times during shift.
2. Dampen wick with water.
3. Swing the humidity reader counter clockwise for 1 1/2 minutes.
   Do this while walking around the department.
   Do not stand near heaters.
4. Push the rod back into the main piece.
5. Bring the dry thermometer to the wet thermometer.
6. Take readings from each thermometer.
7. Subtract the wet reading from the dry reading to get humidity reading.
8. Enter humidity reading in log book.

F. PUTS FINAL IDENTIFICATION MARKS ON ALL PIECES

1. Make sure the paint is dry before marking.
2. Check drawings for directional marks
3. Mark pieces with a marker which will show up against the paint.
   Mark: - the contract number,
   - the drawing number
   - the piece mark;
   - if necessary the number of pieces, and
   - if need directional items
   - L(eft) or R(ight)
   - E(ast) or W(est)
   - outside

   In general, place mark at left end of piece by tag, or as specified in drawing.
   If there is no tag, see inspector.
4. After finish marking, mark cart with MKD, with yellow chalk.
5. Enter marked material on log sheet.

Marking Practices

1. If there are two pieces, mark both pieces with all the information
   In the case of multiple pieces, mark contract number and piece mark number.
2. If there are about eight pieces, then mark every second one.
3. If there are about sixteen or more pieces, then mark a few.
   For steps 2 & 3, Mark at lease one piece with all of the usual marking:
   contract number, drawing number, and piece mark, and number of pieces.
   Mark the other pieces with just the piece mark number.

4. ALWAYS COUNT THE NUMBER OF PIECES.
   In the case of multiple pieces, when entering on the log, may put hash marks for counting, /// until the total number as listed on contract is reached.

5. If it is really busy, ensure the painters have marked date and time completed for coat stage (primer, first and second coat) and initial it. This will help the place carts in areas for drying.

4

G. KEEPS RECORD OF INSPECTED MATERIAL

1. Complete log sheets.
2. Complete computer entry. (See operation I)
3. Complete entries in the painting thickness and humidity books.
4. Enter N contracts from green sheets on log sheet.
   These are entered on the log sheet, but not entered in the computer.
   The reason for entering these is to know the job has been completed.
5. Enter contract number on log sheets.
6. Circle off material list on drawing to indicate that has been painted and marked.
The material might be listed under FAB and/or SHIP
   If there is a right and left piece, circle the correct part.
7. Mark in weight of pieces completed.
8. When entering on log sheet, count the number of pieces.
   If they are all there at the time of the entering, put the actual number.

H. KEEP WORK AREA NEAT AND OBSERVES ALL SAFETY RULES

I. COMPUTER ENTRY OF COMPLETED WORK

1. LOG IN : <password>
2. Call up : <SHIPPING MENU>
   - once projects systems highlighted (with orange over wording)
   - hit <enter>
3. Move cursor so [FCE] is highlighted
   - hit <enter>
4. If looking for missing pieces, highlight [DSI] (drawing status inquiry)
   - hit <enter>, this will explain where it is in the system.
5. Enter data, from drawing or log sheet.
   Hit <enter> after each entry listed below.

a) The contract number consists of 1 alpha and 4 numeric spaces ANNNN
   - M for Manitoba
   - If X number appears on , must be put on contract,

b) The division mark consists of 2 alphas

c) The drawing number is 1 or 2 alphas DRG

d) The mark number is at least 3 numerical, if less than 3, then add zero (0) in front, if 2 numbers then add 2 zeros in front to complete the entry. There are also 3 alphas at end

e) From drawing, enter MARK number

f) Hit <enter>

6. Read computer screen for entries.

FAB QTY	YARD LOC.	FAB DATE
FAB WT		
1	Used for shipping	Must be filled in
automatic		
enter number	Hit <enter>	Type in numeric date
from drawing	To skip over	MM DD YY
		hit <enter>

7. Hit <F9> to save (once all 4 pieces of data are entered).

8. Once enter contract number, and the entry screen will come up by default, at the bottom of the screen when hit <enter>

9. If run into problems, press <F8> to get out, but it won't cancel information.

10. Turn off computer when finished.

PAINTER

EQUIPMENT NEEDED
- scrapper
- wet mil gauge
- safety equipment

SUMMARY OF DUTIES	PAGE	STEP
START OF SHIFT		
1) Receive instructions.	1	A
3) Check oil level on oil cup on paint machine. Add oil if less than half full.		
3) Check to see that everything has been flushed through.	6	H
4) Check Product Data Sheets for safety procedures.	2	D
5) Check air pressure for product being used.	3	E-1
6) Check tip size needed for paint.	3	E-2
7) Turn on outside air valve, if needed.	1	B
OPERATION		
1) Clean material	2	C
2) Mix product	3	D-5
3) Set up spray machine and gun	3	E-3
4) Operate lift for painting	7	K
5) Test spray pattern	4	E-5
6) Apply correct coating	5	F-6
7) Take wet paint mil reading	5	F-7
8) Mark cart with time and date painted.	5	F-9
9) Flush lines when changing paints	6	H
10) Shut air valve on machine when taking extended breaks		
11) Mask and Remove Masking if required (see Paint Checker Module - page 2 Operation C)		
END OF SHIFT		
1) Sweep off both lifts		
2) Flush machine with suitable cleaner	6	H
3) Check and clean filter	6	H-4
4) Place piston rod in down position in fluid section		
5) Shut off air valve on machine.		
6) Leave guns soaking in thinner on lifts.	6	H-3
7) Turn off outside air intake		
TROUBLE SHOOTING	7	L

A. RECEIVE INSTRUCTIONS

1. Attend daily meetings to receive instructions.
   Instructions can be:
   a) verbal from supervisor,
   b) handwritten notes, or
   c) read directly from SN1 sketches.
   The SN1 sketches may be posted on the wall inside Paint Stations.
   The Paint Checker also has a copy of the SN1 sketches.

   Instructions may include:
   a) contract number
   b) piece number
   c) number of pieces
   d) the order of the work to be done (rush or priority),
   e) what must be accomplished on the shift.

   Information on SN1 sketches includes:
   a) type of primer,
   b) type of paint,
   c) number of mils thickness for each coat,
   d) areas not to be coated, and
   e) the number of coats

   Other information which may be added by supervisor or painters includes:
   a) pressure to be used for spray gun,
   b) tip size for paint, or
   c) mixing directions.

2. Other information about paint, equipment problems, product, or changes, may be left by:
   a) supervisor,
   b) paint checker,
   c) other painters, or
   d) previous shift.

B. AREA PREPARATION

1) Turn on lights.
2) Turn on outside air valve if you are beginning to paint.
3) Turn on ventilation.

1

C. CLEAN MATERIAL TO BE COATED

1. Visually inspect material for areas of potential paint failure.

2. Blow off any shot from material and rack uprights.
   a) Use air pressure hose kept by the end of the lift.
   b) Pull lever towards you to start air flow.

3. Clean off any oil/grease spots
   a) Use lacquer thinner (#9 OPEX) and rags to wipe off oil.
   b) Use clean rags (kept in office).
   c) Turn over or change rag so oil is not spread around.

4. Remove scale with needle gun.
   a) Attach needle gun to air hose.
   b) Pull lever to start operation.

5. Remove splatter with scraper.

6. Check for lamination on main piece.
   If too large or flaking, return to wheel.

D. MIX PAINT PRODUCT TO MANUFACTURER'S SPECIFICATIONS.

1. Choose correct coating product according to contract (SN1).

2. Get paint from paint rooms.
   a) Check dates for expiration (do not use if past).
   b) Use oldest stock first.
   c) Bring paint from outside in to bring to operating temperature.
      - Especially important in winter for carbo zinc's and zinc dust.
      - Use fork lift to bring in.

3. Read manufacturer's specifications. (General Guidelines see Appendix 1).
   The information found includes:
      a) the ratios for mixing;
      b) the different products to be mixed;
      c) applying temperature range;
      d) humidity range;
      e) dew ambient temperature;
      f) steel temperature;
      g) pot life of paint.

4. Determine how much paint is needed to finish the contract or shift.
   - May have to mix less than a full can.

2

5. Mix product according to specifications.
   a) Open paint can.
   b) Stir with mixer.
      - The mixer is hooked up to the spray machine and left in cleaner bucket.
      - Turn knob to start mixer.
   c) Visually check to see if product is bad.
      Some indications of bad paint include:
      - it looks like yogurt (inorganic zinc);
      - the can has been damaged or punctured;
      - there are crystals or clumps;
      - there is water in paint.
   d) Mix base for 2-5 minutes before adding catalyst.
   e) Add the filler, powder (binder), and/or curing agent in proper order to the base.
   f) Mix paint.
      - Mix for 5-10 minutes to get even consistency.
   g) Screen mixture to remove any lumps, if necessary.

6) Place machine intake valve into paint can.

E. ADJUST SPRAY MACHINE AND GUN TO CORRECT SETTINGS

Safety Note: When gun not being used, make sure safety lock is on.

1. Check SN1 sketches and manufacturer's sheet for recommended pressures and tip sizes.

2. Select correct tip size.
   The tips are kept in the electrical room with the mechanic

Tips: 3-13 -> 3-15	Thin Viscosity Paint
Tips: 3-17 -> 3-21	Medium Viscosity Paint
Tips: 3-21 and up	Heavy Viscosity Paint

3. Turn T-handle to set correct inlet pressure.
   - The pressure dial is located just above the T-handle.
   - The readings are in psi (pounds per square inch).
   - Pressure should be set around 20-30 psi inlet pressure, until final product adjustment.

4. Test spray pattern on cart.

3

5. Observe spray pattern and adjust as necessary.

Tips
- If tip is too small or damaged,
  a) will not get enough pressure, or
  b) will get fingering.
- If tip is too large, will not get a nice fan pattern.

Pressure

- If pressure is **too low,**
  a) the gun will spit due to dirty needle or air intake paint line,
  b) there will be poor atomization (pebbling),
  c) fingering will occur, or
  d) the spray will not be constant.

- If pressure is **too high**, there may be
  a) runs or sags,
  b) excessive tip wear with inorganic zinc, or
  c) dry spray (more so with inorganic zinc).

F. APPLY COATING TO SPECIFIED THICKNESS AND COVERAGE

1. Determine thickness and number of coats from SN1 sketch
   Look for: a) no paint areas
   b) primer only
   c) number of coats

2. Determine how many mils of wet paint to be applied to get the correct dry mil thickness.
   a) Get this information from specification sheets.
   b) Wet mil thickness should be checked to wet coating, immediately after spraying. See Step 7 for taking wet mil readings.

3. Turn on paint station lights at switch by the door.

4. Determine where to start painting operation
   - This depends on the type of paint and the type of pieces.
   - Avoid applying too much or too little paint.
   - Note where paint dust is staying on piece and wipe off so over spraying does not occur.
   - Start spraying detail first.

5. Operate lift to get into correct position. (See Operation K, page 7).

6. Apply coating.
   a) Put on required safety equipment.
   b) Pull trigger of gun to start paint.
   c) Spray.
      - Do not spray more than your reach.
      - Keep gun 90° to surface when possible.
      - Overlap each coat 50% unless otherwise specified by manufacturer's sheets.
   d) Check application of paint.

7. Use wet paint gauge to measure wet paint thickness.
   Take periodic checks throughout the shift.
   a) Place wet paint gauge on any area painted.
   b) Place vertically and straight to the surface.
   c) Place highest reading at the top.
   d) Touch to surface horizontally.
   e) Read the largest notch which is filled to determine thickness.
   f) Remove gauge without sliding.

8. Check to see if paint is dry before applying next coat.
   Check with manufacturer's sheets for overcoat drying time.

9. Mark cart with time and date painted.

10. After all coats are applied, and failure is noticed, check with group leader, paint checker, or supervisor for direction.

11. Clean lines if changing types of paint for next coating operation.
    (See Step H #2).

G. MATERIAL HANDLING

1. Move racks of material into position for painting and drying.
   This may be the paint checker's job, depending on shift, and training.

2. Check placing of material on racks.
   - Hanging pieces should face the same way.
   - Make sure pieces are not overlapping.
   - Depending on contract, the pieces may have to be moved so as to be able to coat where they had been sitting on the racks.

3. If not painting off the rack, the pieces will have to be turned over.

4. When painting angles on skids, the pieces will have to be turned 3 times to ensure proper coverage.

H. CLEAN MACHINE AND EQUIPMENT WITH CORRECT SOLVENT AND CLEANER

1. Determine the correct solvent and cleaner from manufacturer's specifications.
   This will depend on the type of paint being used.
   If this is not done, then the lines will be clogged.

2. Flush the system with cleaner.
   a) Place intake valve in thinner.
      - Do not allow pick up to touch bottom of pail.
   b) Lower pressure to 20-30 psi inlet pressure.
   c) Remove tip.
   d) Ground gun to pail for static discharge.
   e) Point nozzle of paint gun into paint can.
   f) Pull trigger.
   g) Continue until thinner appears.
   h) Place nozzle into thinner can.
   i) Continue until mixture runs clear (approximately 5 gallons).

3. Leave spray gun in **clean** thinner
   Check with mechanic, as some thinners will damage gun kit.

4. Clean filter.
   a) Take pressure off machine.
   b) Shut off air valve located at regulator.
   c) Bleed line.
   d) Remove filter; if filter plugged, replace with new one.
   e) Wash in clear thinner.
   f) Replace.

I. NOTE AND REPORT DEFECTS IN TOOLS AND EQUIPMENT

1. Report to supervisor or mechanic.
2. Write notes for next shift.

J. OBSERVE ALL SAFETY RULES

1. Personal Protective Equipment
   - Wear rubber gloves and respirator when
      - cleaning,
      - mixing, or
      - spraying.
2. Read safety precautions on product labels.
3. No Smoking.

K. LIFT OPERATION

1. Turn on hydraulic lift switch.
   Station #1: switch is located just outside of station door.
   Station #2: switch located outside to the east side of the paint room door.
2. Make sure safety chains are hooked up.
3. Push lever to go up, push lever down to go down.
4. Make sure of footing.
   - Sweep the padding if necessary.

L. TROUBLE SHOOTING

1) If paint has settled in and clogged the lines,
   Operate hydraulic lift in paint room and drain lines.
   If this does not clear them, contact mechanic.
2) If tip is clogged, turn key and pull trigger.
   If this does not work, change tips, and give clogged tip to mechanic.

APPENDIX 1 PAINTER
GENERAL INFORMATION

PAINT STATIONS

Paint Station 1 is located closest to the wheel.
Paint Station 2 is at other end of the shop with lift.

The paint mixing area is located in the paint room at each paint station.

REFERENCE MATERIAL

1 Paint labels

2. International Steel Council Paint Books

(1 page summaries - book is in supervisor's office.)

These can be photocopied and hung on wall in paint shop.

3. Government Information sheets.

TIP SIZE

The selection of tip will depend on the type of paint and how many mils are required.

In general, use the largest tip you can without having a problem, because that will give the largest rate of application.

- for epoxies, use 21 tip
- generally use 13, 15, 17, 19

The tip size is made up of two numbers, located by guard screw.
The first number indicates the fan spray width at 1 foot.
You must double this number.
For example, 3-15 tip equals 6 inch fan spray at 1 foot. (3" x 2)
The second number indicates the size of the orifice (opening).
It is measured in thousandths of inch.

FAN SPRAY PATTERN

Should spray 12-18 inches from surface, for a 6 inch fan pattern.

PRESSURE

The 45 to 1 pump needs to be set at the inlet pressure.
The pump multiplies the inlet pressure by 45 to get the tip pressure.
For example, an inlet pressure of 50 psi yields 2250 psi at the tip.

CONVERTING WET PAINT THICKNESS TO DRY THICKNESS

The conversion of wet paint thickness to dry paint thickness depends of the volume of solids in the paint.

For example, if the volume of solids is 33%, you get a third dry of what you apply wet, so 12 mils wet paint will give you 4 mils of dry paint.

MIXING

1. In general, the mixing ratio is 5 gallons of base to 1 gallon of curing agent, but it will vary depending on the paint.

2. When operator needs to mix less paint, then will have to estimate the proportions.

3. With Aluminum and Carbon Zincs will need to screen after mixing, to ensure that the solids (dusts) added, are not in clumps.

PAINTING TECHNIQUES

The ideal situation is to spray 90 degrees at 12 inches.

1. Try to keep gun 90 degrees to surface, and try to bend wrist, not arm. Don't want to arc.

2. Do not overreach spray. Operator will get holidaying or uneven coverage.

3. Don't stop gun immediately. Stop the gun and carry past to prevent over spray. If stop gun and hold trigger you will get a heavy line.

4. When spraying supposed to have 50 % overlap in web.

5. Toughest thing to paint is under the flanges.

6. The flatter you can spray, the better off you are.

PAINT STORAGE

Paint should be stored inverted in large shipments.

8

WHEEL OPERATOR

SUMMARY OF DUTIES	PAGE	STEP
START OF SHIFT		
Turn on power	Appendix	
Turn on lights in Paint Department (Panel "J")	Appendix	
Receive instructions	1	
Prepare work area.	1	1
Check Dust Collector and Dust Hopper	1,2	C- A,B
Check Wheelabrator inside.	2,3	C-B,C
Check and Clean scalping screens	3,4	C-D
Check level of shot (top of wheel)	4	C-E
TOWVEYOR OPERATION		
Check amount of working space for towveyor	5	F-2
Verify tags on work pieces on rack	4	E-3
Make sure work pieces are securely fastened	5	E-5
Check work pieces to make sure they will receive shot	5	E-7, 8
Remove any oil or grease on work pieces.	5	E-9
Hook up racks to towveyor	5	F-A
Start towveyor	5	F-A3
OPERATION OF WHEELABRATOR		
As rack reaches entrance of wheel, start wheelabrator	6	B
Turn on exhaust fan and abrasive recycling.	6	B-3
Push buttons for Wheels 1, 2, 3, and 4.	6	B-3
Turn on abrasive	6	B-4
Check ammeter readings - should be between 20-25	6	B-5
If not then, adjust openings on sides of machine	6	B-6
Listen to machine operation	6	B-7
Run the pieces through the Wheel 3 times	6	B-9
GRIT REMOVAL		
After the work pieces have completed wheel cycle, Blow the grit off, using high pressure air hoses.	6	C-3,4
Check pieces to make sure they are clean.	6	C-6
SHOT RECYCLING		
Turn off after when there is no work..	7	D
Turn off exhaust at the end of the shift.		
Turn off Abrasive recycling		
END OF SHIFT/WORK WEEK		
Shut Down Wheel	7	D
Turn off fan and lights .		
Sweep up shot into pit. Sweep along the tracks.		
Clean up around Wheel after every shift.		
Secure work area.		
Friday Night, end of shift, turn off E 327, 326, 325		

A. RECEIVE INSTRUCTIONS AND PAINT SKETCHES.

1. Attend daily meetings to receive instructions.
   Instructions can be:
   a) verbal from supervisor,
   b) handwritten notes left on clipboard at operating station, or
   c) read directly from SN1 .

   Instructions may include:
   a) contract number
   b) piece number
   c) number of pieces
   d) the order of the work to be done (rush or priority)
   e) what must be accomplished on the shift.

The usual practice is verbal instructions, but when busy (4-5 jobs on line), then operator may be given SN1 schedules.

B. WORK AREA PREPARATION

(This is also refers to the operation of Clean Grit Blasting Area page 2)

1. Clean area around the wheelabrator.
   Sweep and Shovel shot on floor around the machine into the shot pit.
   The shot pit is located below the wheelabrator machine. The shot can be put into the pit through either the door of the wheel, or by shoveling it into the pit opening located on the floor below the yellow ladder.

2. Remove Trash Barrels (if full)
   - There are two (2) trash barrels, one on each side of wheel.
   - Assist forklift operator to remove barrels if full.
   - Make sure WHMIS safety label is placed on outside of the barrel.
   (This is forklift operator's job. The labels are located in small cupboard between the wheel operator station and the electrical panel.)

C. WHEEL INSPECTION

A. **Dust Collector**
   1. Inspect **atmosphere** around the blast cleaning machine to see if it is relatively (not large piles) clean and free of dust.
   2. Check **duct work** between machine and collector for leaks.
      This is the big pipe leading to the outside.
      This is on the west side of the machine (opposite side from the door).
      There is too much dust if there are piles of dust on the pipe or on the floor.
   3. Visually check elevators for leaks

1

4. Take **manometer** reading.
   The manometer is located on the west side, hanging inside a post.
   The fluid level (reddish brown colour) should be close to zero on both sides, with no more than a 1 to 2 inch difference. If more, contact the supervisor.
   If the left side is down to 1 to 2 not much dust is going out.

5. Visually check **exhauster drive belt** to dust collector fan for tension.
   Stand on west side of machine facing the paint department. Look up towards rear of wheelabrator. Towards the rear is an engine with a belt.
   Check to see if it is turning freely, and that the belt is not loose.
   Report any problems to mechanic or supervisor.

6. Make sure the **Air Valve/Gate** is open.
   It is a metal sheet, located on the west side of the machine.
   If the dark part (about 1 1/2 inches) is showing, then the valve is open.
   If the bag outside of west side door is blowing, then dust is collecting

B **Dust Hopper**

1. Close overhead door (if open) prior to starting, so dust does not enter shop.
2. Check **shaker mechanism** in operation.
   This must be done before starting the wheel.
3. Turn on power for exhaust (light blue box below "J" lighting panel)
4. Push exhaust fan button on then off before starting shaker.
   The exhaust fan button must be off before starting the shaker.
5. Pull lever open and close a few times, until no dust is falling from chute.
   Lever is located to the right of the operating station.(under power box)
   The open and close positions are indicated by O (open) and C (close).
   The chute is located outside. It can be seen from door to left of station.
6. Close the dust collector.
7. Turn off power to the exhaust.
8. If the outside barrel is full, assist fork lift operator remove full barrel and replace with empty one.
9. Check bag house while bags are being shaken.

C. CHECK WHEELABRATOR

A. Prior to starting this procedure, ensure that **machine is not in operation**.

B. Check Grit Blasting Area

1. Check entrances and exits for abrasive loss
- This can be seen by the amount of grit laying on floor.
- Shovel shot back into the recovery in the interior of machine.
  Shovel is located to left of door.
- Use air hose to blow shot from exit area of wheel back into grit area.
  Safety gear - ear protection, goggles, and mask.

2

2. Check seals and weldments for abrasive wear
- This is done by observing where there are piles of grit, and the size of grit.
  If it is still usable grit, then the opening is large.
3. Report large leaks to supervisor or mechanic.

C. Check Interior (Cabinet) of Wheel Abrator
1 Open door (located on east side of machine)
2. Get trouble light and turn on.
3. Check grating before entering the inside of Wheel.
   Make sure grating is in place, if not, report to supervisor.
   Make sure the grating is not worn out.
4. Enter cabinet
   Pay attention to footing, as grit makes the area slippery.
5. Check level of shot material laying in towveyor tracks/chain tracks.
   If too deep (more than 3 inches), clean track with broom or blow out with high air pressure hose
   If this is not done, then the rack may stop moving and cause a jam.
6. Check Shaker Screen in recovery pit.
   The shaker screen is located below the grating.
   Look through grating on floor, to see if screen is clogged with debris.
   - If clogged, operator will have to go down into pit to clean it.
   The entry to screen is through the grate in front of door.
   Must have two people to lift up grate.
7. Inspect cabinet liners for wear.
   If they are worn or cracked, report to supervisor
8. Inspect blower for vane wear.
   Inspect vanes located in each wheel inside of cabinet.
9. Inspect cabinet wall and ceilings for evidence of abrasive wear,
   If there are cracks or missing areas, report wear to supervisor
10. Exit machine.
11. Close door (tightly)
    Use hammer to knock handles into shut position.
    Make sure door is shut because there is a lot of pressure when machine in operation, and this will cause a great deal of grit loss.

Note : if the machine is in good condition, there will be limited shot in the basement.

D. Check Level of Shot
Safety Note: Pay attention to footing, as metal and roof top may be slippery.

The following operations must be performed on both sides of the wheel.
1. Climb up the ladder.
   Make sure the shot pit cover (on floor) is closed.
2. Shut elevator off before cleaning the scalping screen.
3. Open access plate to screen area.
   - May have to brush grit away from access plate.
   - Turn knob counterclockwise to open
   - Place plate on floor

3

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4. Clean junk and trapped metal from scalping screen.
   Reach in and scoop out any debris.
   Place in garbage pail located to right.
5. Check scalping screen for holes and wear.
   (If worn, report to supervisor or mechanic)
6. Verify level of shot in hopper
   The hopper should be at least half full. If not, then will have to go to pit to fill shot hopper (see operation # E)
7. Eyeball the elevator gear to see that it is turning easily.
   If not, report to supervisor or mechanic.
8. Clean roof (sweep about twice a year).
9. Empty debris pails when full.
   Use manual crane (hoist).

E. Add Shot When Necessary
1. Lift up shot pit cover.
2. Get extension light and climb down ladder into shot pit.
3, Check level of shot in hopper.
   If less than half full, shovel shot into hopper.
4. Turn off elevator before adding shot.
4. Add shot to pit as needed.
   Use rack to bring bags of shot inside the wheel.
   Drain one bag by Front West, one by Back East and two in the middle.

E. MATERIAL PREPARATION

1. Assist crane operator load racks and place them on towveyor track.
   The usual space between racks is enough so the operator can walk between them for blowing off grit.

2. Check towveyor pulleys, front (in paint shop) and back, to make sure seated in slot. If not, straighten pulley.

3. **Check racks** on towveyor track
   1. Verify that tags are attached to pieces.
      If there are no tags, check with supervisor, unless have received previous instructions for a specific contract number written on piece.
   2. Read tags to verify contract number, piece number and number of pieces.
   3. Make sure that pieces requiring different operations are hung on separate racks. Do not mix contracts on racks, unless they require the same coating.

4. **Mark front** of rack (with chalk) if the material on it is not for "regular" painting. Put GALV for galvanizing.

5. Visually **check pieces** to make sure they are securely fastened.
   a) If small/loose pieces tie them with wire to each other, and to rack
   If this is not done then the material may come loose and hit the wheel, or block the track causing: a) the rack to be stopped,
   b) having the chains come out from track or
   c) the rack coming off the track .
   If this happens, the manual crane will have to be used to get the rack back on track.

6. Make sure the S hooks and material are all facing the same way.

7. Make sure the pieces are loaded so that the shot will fall off the piece.
   Place pieces with the holes down, so shot falls out.
   (Upon occasion, plugs may be made and inserted in holes)

8. Make sure all pieces are loaded so all areas will be subject to abrasive.

9. Check to see if there is any oil or grease or paper on the pieces.
   Wipe oil or grease off with brush and thinner (OPEX #9 from stores)
   Remove paper with a scraper.

F. WHEELABRATOR OPERATION

A. HOOK UP RACKS TO TOWVEYOR

1. Use proper safety equipment, goggles, leather gloves, knee protector.
2. Check to see how many racks may go through wheel at a time.
   The number of racks will depend on
   a) if the first paint station is in operation, and
   b) the length of the load on the rack.
3. Start movement of towveyor - slow speed
   (see Appendix for layout of board)
   Pull up red knob for power,
   Turn small black knob counter clockwise to slow down the speed.
   Push black forward button
4. Use S hook to catch the chain
5. Lift chain
6. Take in hand(s)
7. Hook the chain which is moving over notch on rack.
8. Repeat for number of racks to go through the Wheel.

5

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B. OPERATION OF WHEELABRATOR

1. Turn the black knob clockwise to get more speed to move the racks to the Wheel Abrator (see diagram)
2. Reduce speed once the racks have arrived at entrance of WheelAbrator.
3. While racks are moving forward:
   a) push on buttons for exhaust fan, and abrasive (see diagram)
   b) push on buttons for Wheels, 1, 2, 3, and 4 in this sequence.
4 Once the first rack has arrived at the WheelAbrator,
   - Turn abrasive knob to left (Hand) position.
5 Verify that the wheel ammeter read between 20-25.
   The number will be around 12 until abrasive is turned on.
   If 12-11 there is a big problem of leakage of shot
   If 30, nothing is in the wheel, it is empty
   If the numbers read 13-19 or 26-29, adjust vanes/chute doors.
6. Adjust vanes/chute doors for proper readings. (part of orientation tour)
7. Listen to machine operation. It should be Humming.
   If Howling sound, there is a problem.
   If Big Bang (Explosion), a cup may have exploded.
   Other noises may indicator that a piece has fallen off.
   - Shut Down the Machine (See Operation D page 7)
   Check to see if a piece has fallen off.
      If so, then hook piece back on and continue operation
      If not, then contact mechanic to report the noise
8. Continue to monitor wheel operation
9. Once all pieces through the machine for the first time
   Stop and reverse towveyor direction for second pass through machine
   Continue monitoring
10. Once piece through on second pass
   Stop towveyor and place in forward direction for third and final pass.
   Do not turn off Wheel.
11. Once all material through the wheelabrator
   Turn off abrasive flow by pushing off buttons of Wheel 1, 2, 3, and 4.

C. REMOVE GRIT

1. After material is blasted, the shot grit must be removed.
   This may be started as first rack is coming out of the wheel.
2. Put on safety equipment, goggles and face masks.
3. Use air hoses to remove grit.
   Turn on air flow (knob to left of station)
   Pull trigger on handle to start air through gun.
4. Grit removal
   a) try to blow shot back into the wheel.
   b) make sure get at all areas, crevices in beams, columns etc.
   c) may have to blow air up from underneath the material.
   d) must go side to side to get at all areas of material.
5. Check to see that grit has been removed.
   May have to hand sweep/shovel some crevices, or flat pieces.

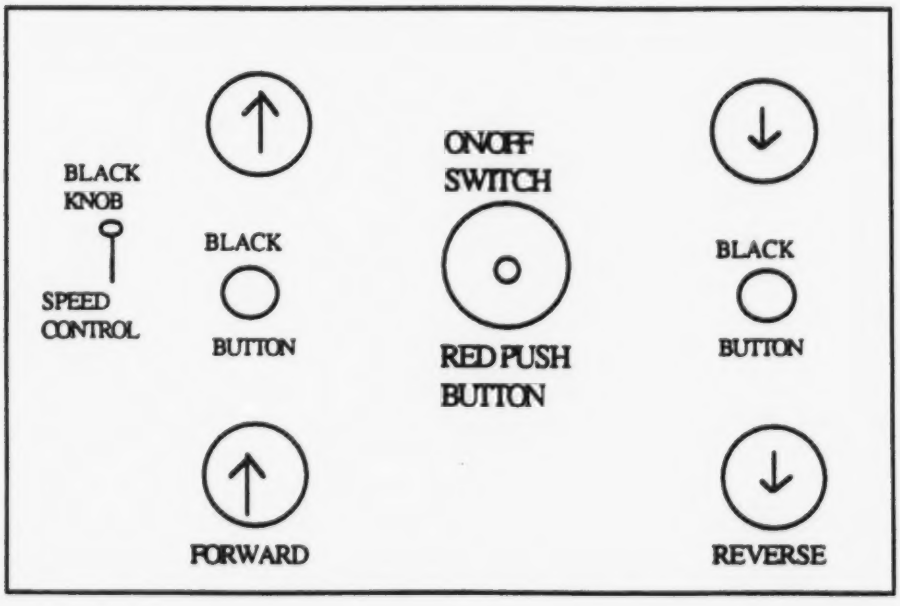
6

D. WHEELABRATOR SHUT DOWN

1. Turn off shot abrasive.
1. Stop wheels, by pushing off buttons of Wheel 1,2, 3, and 4.
2. After pit is empty, stop shaker and elevator .
3. Wait five minutes for dust collector to cycle
4. Collect dust in hopper.
5. Clean Dust Hopper (see Operation B, page 2).
5. Lock main switch to "OFF".

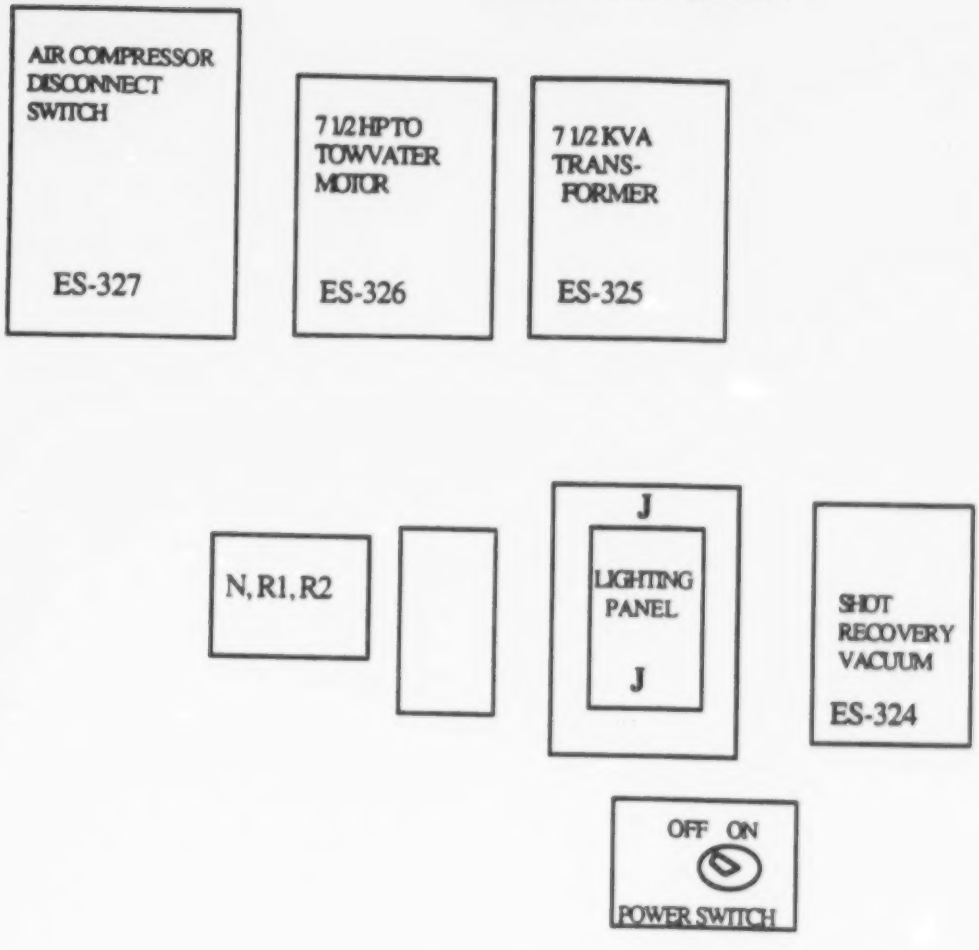
APPENDIX WHEEL OPERATOR

TOWVEYOR PANEL

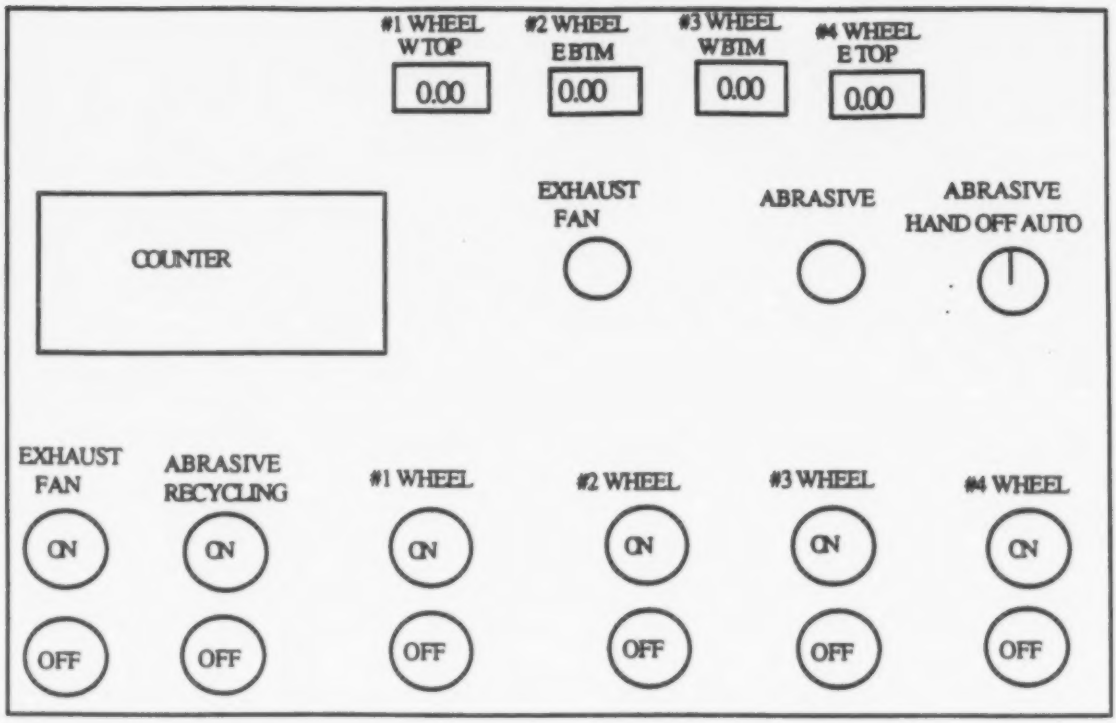


7

ELECTRICAL PANEL



WHEELABRATOR PANEL

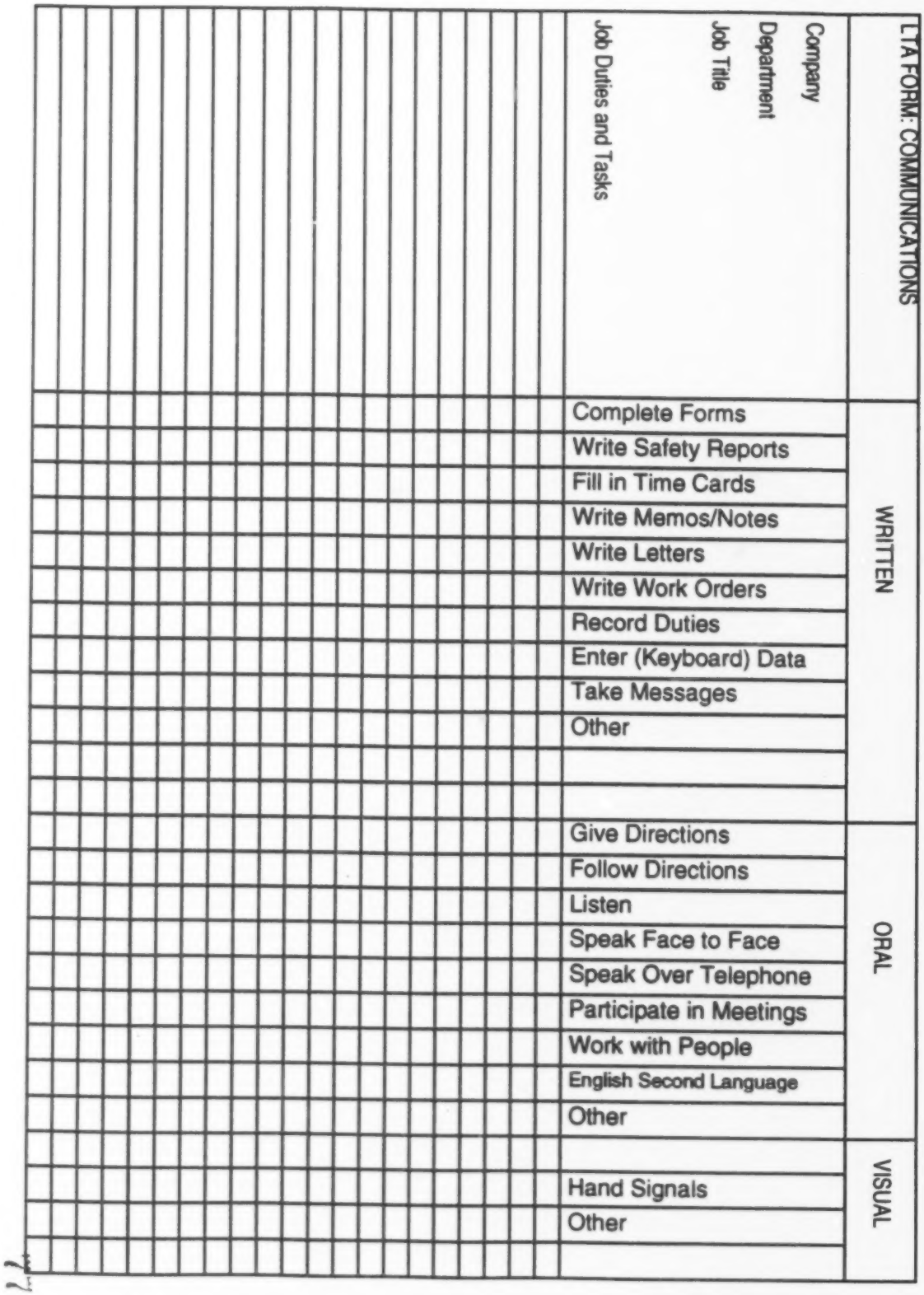


LITERACY TASK ANALYSIS FORMS

Appendix D

LTA FORM: READING	RECOGNIZE/ USE						READ AND INTERPRET						OBTAIN INFORMATION					READ				READING STRATEGIES			
Company Department Job Title Job Duties and Tasks	Match Letters	Symbols	Abbreviations	Jargon	Technical Language	Other	Charts/Graphs	Drawings/Diagrams	Schematics	Blueprints	Tables	Other	Code Books	Job Sheets	Labels/Tags	Computer Printouts	Other	Memos/Notes	Manuals	Directions	Other	Skim/Scan	Compare/Contrast	Locate Information	Other

LTA FORM: MATHEMATICS	
Company	
Department	
Job Title	
Job Duties and Tasks	
Date/Time	
Count Numbers (Quantity)	
Match Numbers	
Whole Numbers Add Subtract	
WholeNumbers Multiply/Divide	
Fractions Add Subtract	
Fractions Multiply/Divide	
Decimals Add Subtract	
Decimals Multiply/Divide	
Convert Fractions to Decimals	
Comparison: More, Less, Equal	
Percentages/Ratios	
Imperial Measurement	
Metric Measurement	
Convert Metric to Imperia	
Estimate	
Positive/Negative Numbers	
Calculate Area	
Calculate Perimeter	
Calculate Volume	
Calculate Cutting Speed	
Use Measuring Tape	
Use a Calculator	
Use Other Math Tools	
Other	


LTA FORM: COMMUNICATIONS
Company
Department
Job Title
Job Duties and Tasks
WRITTEN
Complete Forms
Write Safety Reports
Fill in Time Cards
Write Memos/Notes
Write Letters
Write Work Orders
Record Duties
Enter (Keyboard) Data
Take Messages
Other
ORAL
Give Directions
Follow Directions
Listen
Speak Face to Face
Speak Over Telephone
Participate in Meetings
Work with People
English Second Language
Other
VISUAL
Hand Signals
Other

Appendix D

LTA FORM: READING	RECOGNIZE/ USE						READ AND INTERPRET						OBTAIN INFORMATION					READ				READING STRATEGIES			
Dominion Bridge Paint Department Paint Checker Job Duties and Tasks	Match Letters	Symbols	Abbreviations	Jargon	Technical Language	Other	Charts/Graphs	Drawings/Diagrams	Schematics	Blueprints	Tables	Other	Code Books	Job Sheets	Labels/Tags	Computer Printouts	Other	Memos/Notes	Manuals	Directions	Other	Skim/Scan	Compare/Contrast	Locate Information	Other
Receive Instructions																									
Check Material to Drawings																									
Check Tag Numbers																									
Check SN1 Sheets																									
Identify Areas to be Masked																									
Take Paint Thickness Readings																									
Take Humidity Readings																									
Complete Log Sheets																									
Complete Computer Entry																									

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LTA FORM: MATHEMATICS

Dominion Bridge

Paint Department

Paint Checker

Job Duties and Tasks	Receive Instructions	Check Material to Drawing	Mask Area	Take Paint Thickness Readings	Take Humidity Readings	Put Final Identification Marks on Pieces	Record Material Inspected
Date/Time							
Count Numbers (Quantity)							
Match Numbers							
Whole Numbers Add Subtract							
WholeNumbers Multiply/Divide							
Fractions Add Subtract							
Fractions Multiply/Divide							
Decimals Add Subtract							
Decimals Multiply/Divide							
Convert Fractions to Decimals							
Comparison: More, Less, Equal							
Percentages/Ratios							
Imperial Measurement							
Metric Measurement							
Convert Metric to Imperial							
Estimate							
Positive/Negative Numbers							
Calculate Area							
Calculate Perimeter							
Calculate Volume							
Calculate Cutting Speed							
Use Measuring Tape							
Use a Calculator							
Use Other Math Tools							
Other							

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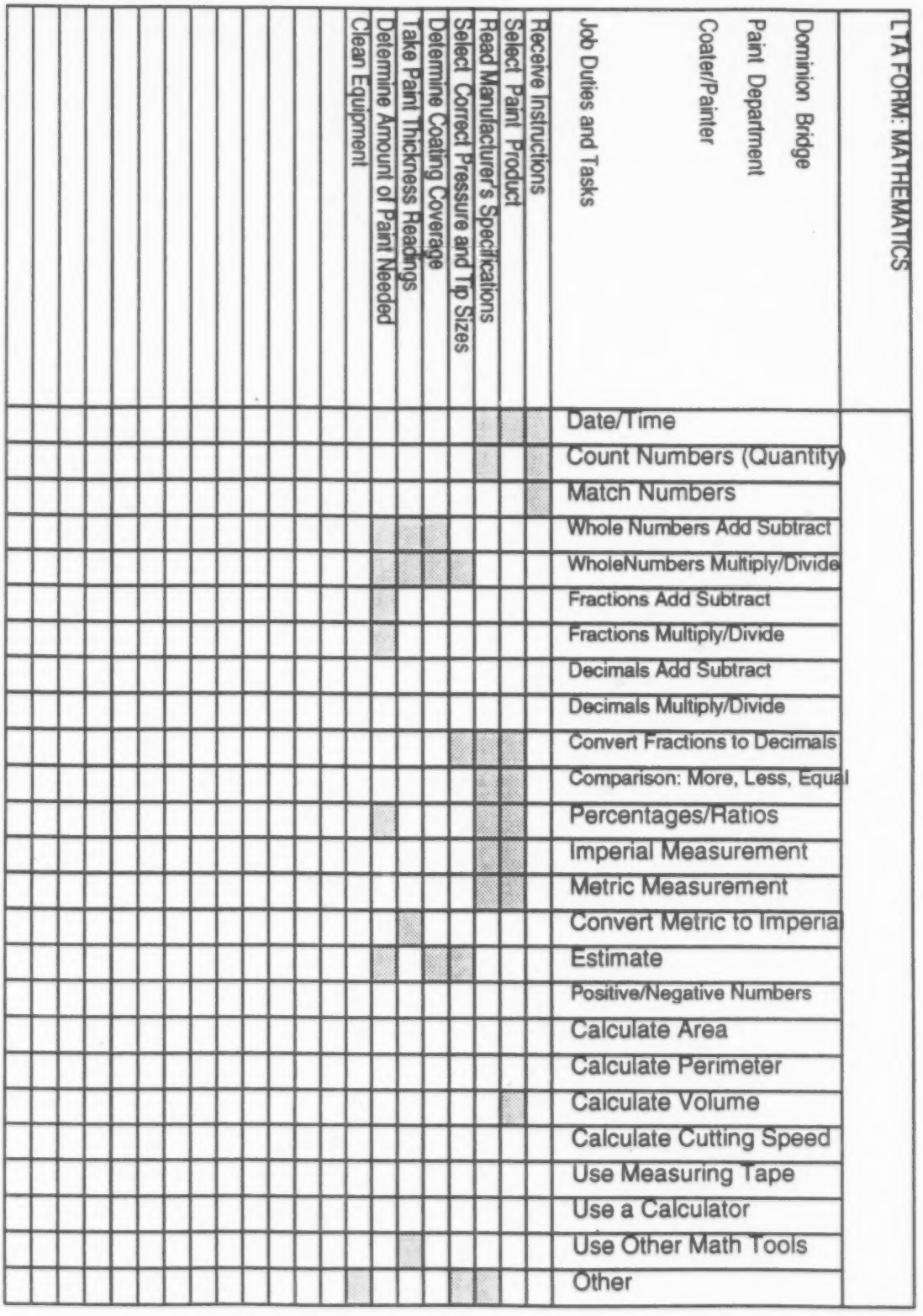
Appendix D

LTA FORM: COMMUNICATIONS	WRITTEN												ORAL									VISUAL			
Dominion Bridge Paint Department Paint Checker Job Duties and Tasks	Complete Forms	Write Safety Reports	Fill in Time Cards	Write Memos/Notes	Write Letters	Write Work Orders	Record Duties	Enter (Keyboard) Data	Take Messages	Other			Give Directions	Follow Directions	Listen	Speak Face to Face	Speak Over Telephone	Participate in Meetings	Work with People	English Second Language	Other		Hand Signals	Other	
Receive Instructions																									
Report Possible Errors																									
Identify Areas to be Masked																									
Record Paint Thickness & Humidity Reading																									
Put Final Identification Marks																									
Record Inspected Materials																									
Operate Crane																									

Appendix D

LTA FORM: READING	RECOGNIZE/ USE						READ AND INTERPRET						OBTAIN INFORMATION					READ				READING STRATEGIES			
Dominion Bridge Paint Department Coater/Painter Job Duties and Tasks	Match Letters	Symbols	Abbreviations	Jargon	Technical Language	Other	Charts/Graphs	Drawings/Diagrams	Schematics	Blueprints	Tables	Other	Code Books	Job Sheets	Labels/Tags	Computer Printouts	Other	Memos/Notes	Manuals	Directions	Other	Skim/Scan	Compare/Contrast	Locate Information	Other
Receive Instructions																									
Select Paint Product																									
Read Manufacturer's Specifications																									
Select Correct Pressure and Tip Sizes																									
Determine Coating Coverage																									
Take Paint Thickness Readings																									
Check for Paint Failure																									
Clean Equipment																									
Report Defects in Tools & Equipment																									
Observe Safety Rules																									



LTA FORM: MATHEMATICS	Receive Instructions	Select Paint Product	Read Manufacturer's Specifications	Select Correct Pressure and Tip Sizes	Determine Coating Coverage	Take Paint Thickness Readings	Determine Amount of Paint Needed	Clean Equipment
Dominion Bridge								
Paint Department								
Coater/Painter								
Job Duties and Tasks								
Date/Time		■	■					
Count Numbers (Quantity)			■					
Match Numbers	■							
Whole Numbers Add Subtract					■	■	■	
WholeNumbers Multiply/Divide				■	■	■	■	
Fractions Add Subtract							■	
Fractions Multiply/Divide							■	
Decimals Add Subtract							■	
Decimals Multiply/Divide							■	
Convert Fractions to Decimals		■	■	■				
Comparison: More, Less, Equal		■	■					
Percentages/Ratios		■	■				■	
Imperial Measurement		■	■					
Metric Measurement		■	■					
Convert Metric to Imperial						■		
Estimate				■	■		■	
Positive/Negative Numbers								
Calculate Area								
Calculate Perimeter								
Calculate Volume		■						
Calculate Cutting Speed								
Use Measuring Tape								
Use a Calculator								
Use Other Math Tools						■		
Other			■	■				■

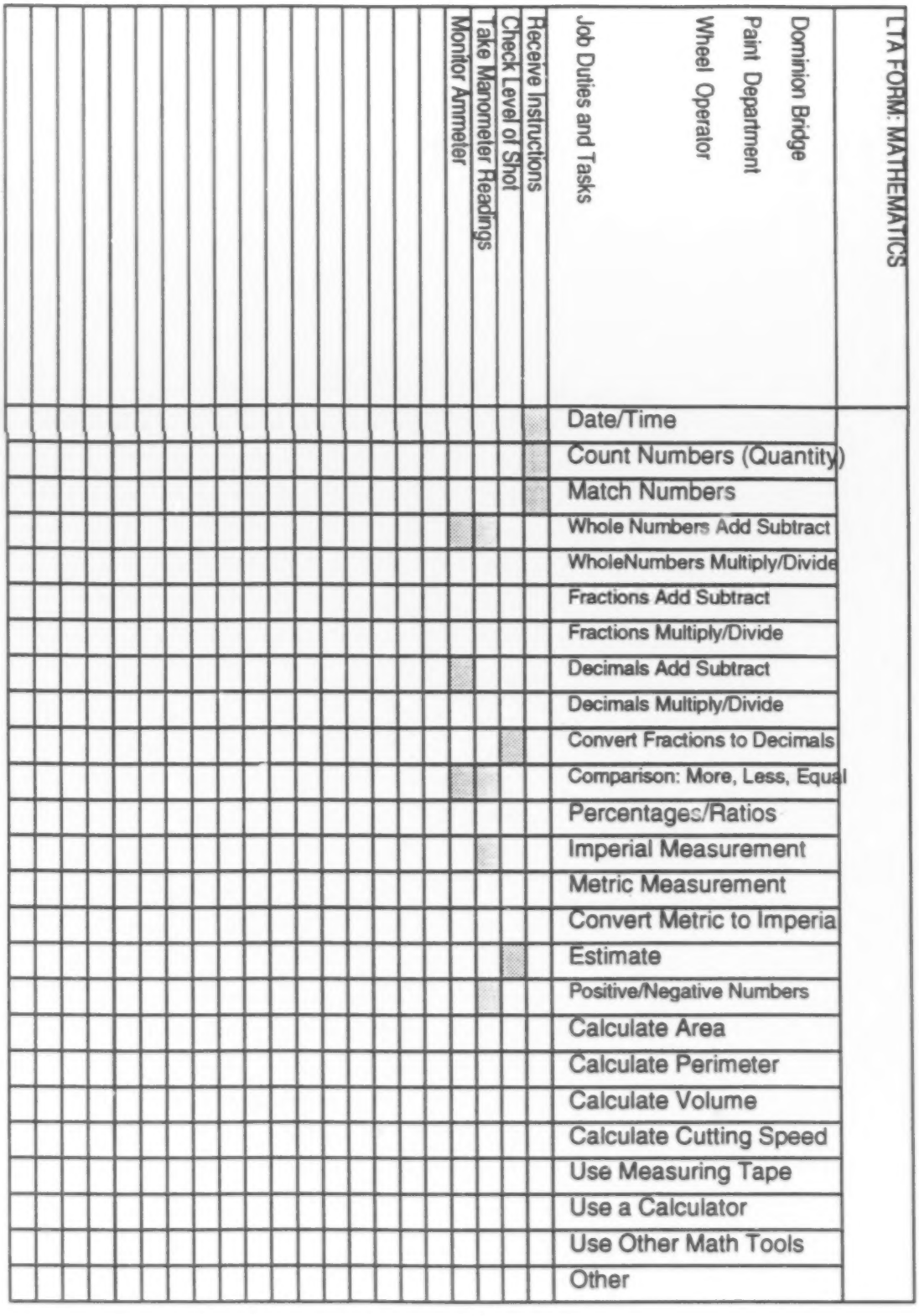
Appendix D

LTA FORM: COMMUNICATIONS	WRITTEN												ORAL									VISUAL			
Dominion Bridge Paint Department Coater/Painter Job Duties and Tasks	Complete Forms	Write Safety Reports	Fill in Time Cards	Write Memos/Notes	Write Letters	Write Work Orders	Record Duties	Enter (Keyboard) Data	Take Messages	Other			Give Directions	Follow Directions	Listen	Speak Face to Face	Speak Over Telephone	Participate in Meetings	Work with People	English Second Language	Other		Hand Signals	Other	
Receive Instructions														■		■				■					
Mark Cart										■				■											
Report Defects				■														■	■		■				
Move Racks																			■				■		

Appendix D

LTA FORM: READING	RECOGNIZE/ USE						READ AND INTERPRET						OBTAIN INFORMATION					READ				READING STRATEGIES			
Dominion Bridge Paint Department Wheel Operator Job Duties and Tasks	Match Letters	Symbols	Abbreviations	Jargon	Technical Language	Other	Charts/Graphs	Drawings/Diagrams	Schematics	Blueprints	Tables	Other	Code Books	Job Sheets	Labels/Tags	Computer Printouts	Other	Memos/Notes	Manuals	Directions	Other	Skim/Scan	Compare/Contrast	Locate Information	Other
Receive Instructions																									
Turn on Power																									
Check Racks																									
Inspect Wheel																									
Turn on Wheel																									
Monitor Operation																									

Appendix D



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Appendix D

LTA FORM: COMMUNICATIONS	WRITTEN												ORAL									VISUAL			
Dominion Bridge Paint Department Wheel Operator Job Duties and Tasks	Complete Forms	Write Safety Reports	Fill in Time Cards	Write Memos/Notes	Write Letters	Write Work Orders	Record Duties	Enter (Keyboard) Data	Take Messages	Other			Give Directions	Follow Directions	Listen	Speak Face to Face	Speak Over Telephone	Participate in Meetings	Work with People	English Second Language	Other		Hand Signals	Other	
Receive Instructions																									
Mark Cart																									
Report Possible Defects																									
Assist Crane Operator																									

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